

A Statistical Analysis of Patient Deaths in NMC Teaching Hospital

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Abstract

Introduction	In oriental setting, where indigenous practitioners of medicine abound, people seek hospital admissions, when indigenous treatment has failed or when a disease has advanced to a near terminal stage. With this word of caution, the present study seeks to present a statistical analysis of patient deaths recorded in the year 2002 in NMC teaching hospital.
Objective	The study endeavors to high light the magnitude of hospital deaths, the causes leading to deaths and demographic characteristics of persons affected, with a view to record base –line data for future comparison as well as to strengthen the technical and administrative management of patient care.
Methods	The complete data pertaining to the year 2002, from Jan to Dec was borrowed for this study. The data so collected was analyzed by standard statistical tools. SPSS 10 and Excel 97 program were applied for completing the study
Results	In the year 2002, 69722 persons attended NMCTH outdoor sections to seek treatment for various medical problems. 4666 or 6.7 percent were hospitalized, of which 4569 or 97.79 percent were discharged after recovery and 97 Or 2.07 percent died while undergoing treatment. Out of total 97, patient deaths recorded 56 or 57.7 percent were males and 41 or 42.3 percent were females. Highest proportion of deaths was recorded in 50-60 years age. Median duration of hospital stay was 3.3 days (21.65%). Trimmed mean expenditure for hospital care varied from Rs 2841.69 to 7041.07.
Conclusion	A statistical analysis should be done regularly to monitor the overall services of hospital as well as its different specialties and subspecialties.
Keywords	Demographic characteristics, Causes of deaths, Duration of hospital stay, Expenditure incurred on hospitalization .

Introduction

NMC teaching hospital is gradually taking shape of a high-ranking apex hospital extending all types of specialist and super-specialist medical care to the masses, besides training and teaching of the medical-under graduates. Research activities are also high on agenda after unfolding hospital services to full amplitude. Broadly speaking, on first thought the quality of services may be evaluated by recovery rate and death rate among patients seeking medical aid in outdoor and indoors of hospital wings. In oriental setting, where indigenous practitioners of medicine abound, people seek hospital admissions,

when indigenous treatment has failed or when a disease has advanced to a near terminal stage. With this word of caution, the present study seeks to present a statistical analysis of patient deaths recorded in the year 2002 in NMC teaching hospital. The study endeavors to high light the magnitude of hospital deaths, the causes leading to deaths and demographic characteristics of persons affected, with a view to record base –line data for future comparison as well as to strengthen the technical and administrative management of patient care.

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Methods and Materials

NMC teaching hospital maintains a medical record section. Indoor and outdoor wing records of all patients are systematically preserved in this section. The complete data pertaining to the year 2002, from Jan to Dec was borrowed for this study. The data so collected was analyzed by standard statistical tools. SPSS 10 and Excel 97 program were applied for completing the study. Various cognate factors like demographic characteristics, causes of deaths by international classification; duration of hospital stay and expenditure incurred on hospitalization were worked-out.

Results

In the year 2002, 69722 persons attended NMCTH outdoor sections to seek treatment for various medical problems. 4666 or 6.7 percent were hospitalized, of

which 4569 or 97.79 percent were discharged after recovery and 97 or 2.07 percent died while undergoing treatment. Out of total 97, patient deaths recorded 56 or 57.7 percent were males and 41 or 42.3 percent were females. Caste wise break up of patient deaths data, revealed that of total 75 or 77.3 percent were Hindus 21 or 21.6 percent were Buddhists and rest 1 or 1.0 percent was Muslim. Areawise 40 or 41.2 percent deaths occurred inpatient from catchment area, 31 or 32.0 percent from the valley and 26 or 26.8 percent belonged to areas outside the valley.

Month wise occurrence of deaths is set in table 1. To reveal the monthly trend, three month moving monthly averages were calculated. Lowest rates were recorded in the month of March and October followed by April, May June and October. Highest rates were seen in July, November and December.

Table 1: Month wise admissions, discharge and death

Month	Admission	Discharge	Death	Death Rate	3 months Moving Average
Jan	286	323	9	2.79	-
Feb	342	302	6	1.99	1.93
Mar	396	391	4	1.02	1.54
Apr	315	306	5	1.63	1.68
May	342	333	8	2.40	1.71
Jun	567	543	6	1.10	2.39
Jul	497	407	15	3.69	2.24
Aug	430	465	9	1.94	2.65
Sep	521	514	12	2.33	1.76
Oct	345	394	4	1.02	2.23
Nov	280	268	9	3.36	2.50
Dec	345	318	10	3.14	-
Total	4666	4564	97	2.07	-

Table 2 shows patient deaths in various ages. Highest proportion of deaths was recorded in 50-60 years age (21.65%), followed by 15.46 percent and 13.4 percent in 20-30 years and 60-70 years age. The 71 percent death patients were below 60 years of

age. The sex ratio was found 136.59 males per 100 female deaths. The probability of getting 0, 1 and 3 male deaths out of 10 is 0.00018, 0.0025, and 0.0558 respectively using binomial distribution.

Table 2: Age distribution of patients deaths by sex

Age	Male	Female	Total	Proportion
Under 10	3	3	6	0.06
10-20	4	5	9	0.09
20-30	7	8	15	0.15
30-40	2	4	6	0.06
40-50	8	4	12	0.12
50-60	15	6	21	0.22
60-70	9	4	13	0.13
70-80	6	3	9	0.09
Above 80	1	4	5	0.05
Total	56	41	97	1.0

Causes of patient deaths are set forth in table 3. The records reveal that highest mortality load of 24.74 percent was borne by diseases of respiratory system, of which underlying diseases were asthma, acute respiratory failure, lobar pneumonia, COPD, Pulmonary Oedema and chest infection. Next came, the diseases of digestive system and nervous

system, of which the leading causes were cirrhosis of liver, hepatitis, and cerebral vascular accidents. Infections and parasitic diseases contributed 10.31 percent of mortality load – Tuberculosis, AIDS, and neonatal Tetanus. Neoplasm contributed equally i.e. 10.3 percent of the total mortality load. Other causes of mortality are given in the same table.

Table 3: Cause of patient deaths, duration of stay and expenditure

Class Diseases	ICD Code ¹	Number	Duration of Stay	Median	Trimmed Mean (Rs)	Median Expenditure Per Day
				Expenditure (Rs)		
I Infectious and parasitic Diseases	A00-B99	10	4	2525.5	2959.17	631.37
II Neoplasms	C00-D48	10	2	2200	4064.01	1100
III Diseases of Blood and Blood Forming Organ	D50-D89	2	*	3588	**	
V Mental and Behavioral disorders	F00-F99	3	3.5	5622.5	**	1606.42
VI Diseases of Nervous System	G00-G99	12	1	2210	2841.69	2210
IX Diseases of Circulatory System	I00-I99	8	4	4230	5185.58	1057.5
X Diseases of Respiratory System	J00-J99	24	2	2329	2896.3	1164.5
XI Diseases of Digestive System		14	7	6735	7041.07	962.14
XV Pregnancy, Childbirth and the Puerperium	O00-O99	3	*	660		
XVII Congenital Malformations, Deformation and Chromosomal Abnormalities	Q00-Q99	2	-	-	-	
XIX Injury, Poisoning and Certain Consequences of External Causes	S00-T98	9	3	4007.5	4149.86	1335.83

Table 3 also shows the median duration of hospital stays and expenditures during hospitalization. Median duration of hospital stay was 3.3 days, with longest hospital stay for diseases of digestive system as 7 days and shortest of 1 day for diseases of Nervous system. Diseases of other system had intermediate duration of hospital stay ranging from 3 to 4 days.

Trimmed mean expenditure for hospital care varied from RS 2841.69 to 7041.07. Maximum trimmed mean expenditure of RS 7041 was recorded for diseases of digestive system. Median expenditure per patient per day varied between 631.37 to 1606.42 in most of the diseases. With maximum of Rs 2210 per patients per day in nervous and minimum of Rs 631.37 in infection and parasitic diseases.

Discussion

The three important causes of mortality were COPD, CVA and Cirrhosis of liver, under the study. Annual health report 2002/03 also stated COPD and CVA were top two cases of mortality in Bir hospital². Similarly, Tropical Hospital at Kathmandu also reported 11.11 percent inpatients deaths were due to COPD². The ten percent hospital death was due to cancer under the study. Bhaktapur Cancer Hospital reported out of 4389 inpatients 170 patients died due to different types of cancer from the year 1999 to 2003. The death rate was decreased from 5.09 percent in the year 1999 to 2.83 percent in the 2003³. Most of these causes

are amenable to effective interventions, hence are subjects of research and action orientated programs.

It was known that total 178, 233 patients admitted in all government hospital of Nepal of which 2431 deaths. It was reported 1.36 percent fatality rates among inpatients of all hospital of Nepal with 95 percent confidence level 1.31 percent - 1.41percent².

The overall indoors-patient death rate of 2.07 percent, with 17 percent bed occupancy rate found under the study. Among the central hospitals, the highest death rate (6.22 %) was seen in Bir hospital with the highest 94 percent bed occupancy rate and the lowest death rate (0 %) was seen in mental hospital with 74 percent bed occupancy rate. As of the available report, death rate among inpatients at central hospitals was declined in the 2002/03 compare to 2001/02².

Medical Records of hospitals in Kathmandu valley revealed that urban area has higher number of respiratory problems than in rural. From the fiscal year 1996 to 1998 number of ARI patients was increasing at rate 22.89 percent per year. Number of OPD visits had increased from 9.99 to 10.11 percent during same period of time. Total mortality cases in Kathmandu are 84 persons and the number of reparatory symptoms days is 1.5 millions annually. The total health damage to be NRs 210 millions⁴.

Retrospective study carried out in Bir hospital had explained that 2.33 per 100,000 suffer from carcinoma gall bladder. It indicates there is very low incidence and death rate of carcinoma gallbladder⁵.

The median duration of hospital stay of 3.3 days and range of 1-7 days is very short. These rates were worked out on the basis of hospital death cases, and do not indicate true duration of hospital stay of all indoor patients. It appears most of the cases were admitted in terminal stages, hence the short duration of staying. Similarly median expenditure per patient per day ranging from 631.37 to 2210 is very reasonable.

Expectations are growing high among public and health professionals to develop and maintain a high standard of medical care delivery system in Nepal. The concept of medical audit, quality assessment of hospital care and concurrently taken mid term corrections are being increasingly applied to improve the hospital system. Subject wise hospital outdoor and indoor attendance, recovery rate and mortality rate of hospitalized patients give a broad out line of the efficiency of technical hospital services. Besides, these, bed-occupancy Rate, duration of hospital stay and turn over interval are also calculated as measures of utilization of beds, pressure on hospital beds and to plan a waiting list for indoor admissions. The bed occupancy rate is calculated by dividing the actual number of occupied bed days by available bed days expressing as percentage where is turn over interval is worked out by dividing the number of vacant, bed days by total number of indoor admissions multiplied by 100. The former is an index of utilization of hospital beds, while later is a measure of demand for or pressure on hospital beds⁶.

Meaningful comparison of hospital deaths requires adjustments for severity of illness, length of hospital stay, age, diagnosis and types of admissions. Suitably standardized hospital death rates are used for indicators of quality cares^{7,8}.

It is also seen that mortality rates are associated with number of doctors, number of nurses. It is recommended to estimate doctor: mortality rate, doctor: bed ratio, nurses: mortality rate, nurses: bed ratio⁶.

A statistical analysis should be done regularly to monitor the overall services of hospital as well as its different specialties and subspecialties. Society requires regular upgrading of the medical care system incorporating the latest development in technical fields. This entails on going monitoring, evaluation and mid course correction.

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